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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/569,514  | 04/02/2007  | Songming Huang       | 57,0542 US PCT      | 8613             |
| 370/3 7590 07/28/2010<br>SCHLUMBERGER-DOLL RESEARCH<br>ATTN: INTELLECTUAL PROPERTY LAW DEPARTMENT<br>P.O. BOX 425045<br>CAMBRIDGE, MA 02142 |             |                      |                     |                  |
| EXAMINER<br>WONG, ALBERT KANG   |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 2612  |             |                      |                     |                  |
| MAIL DATE   |             | DELIVERY MODE        |                     |                  |
| 07/28/2010  |             | PAPER                |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/569,514

**Applicant(s)**

HUANG ET AL.

**Examiner**

ALBERT K. WONG

**Art Unit**

2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 April 2007.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-30 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 24 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/GS/US)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

1. This Office action is in response to the application filed April 2, 2007. Claims 1-30 are pending. This application claims the benefit of GB application 0320804.8 filed September 5, 2003. The Examiner thanks Vince Locciano for providing answers to questions pertaining to the status of the application on July 26, 2010.

2. Claim 19 is objected to because of the following informalities: This claim has an extra period. Appropriate correction is required.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 20, this claim is missing a period.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hahn et al (2003/0026167) in view of Doremus (EPO 0 685 628).

Regarding claim 1, Hahn teaches an acoustic telemetry system for communicating data from a borehole to the surface of between locations. It includes a receiver and transmitter separated by an acoustic channel. Paragraph 32 teaches that the signal may be wave modulated pulses which is equivalent to the claimed modulated continuous waveform. Further, paragraph 43 teaches that the transmitter may include piezoelectric elements or magneto-strictive elements which are considered electro-active transducers. Hahn does not explicitly teach the communication of digital data, however, the reference teaches the transmission of pulse coded signals which is suggestive of digital data. Hahn does not teach a communication channel with a cross-sectional area of  $58 \text{ cm}^2$  or less. Doremus teaches an acoustic communication channel that may be located via the casing of a borehole. One of ordinary skill in the art would recognize that such a channel would be substantially smaller than the cross-section of a conventional borehole and would be within the claimed range. It would have been obvious to combine the references since they are in the same field of endeavor.

Regarding claim 2, Hahn teaches modulation of a waveform for data transmission.

Regarding claim 3, a communication channel is not limited to a single measurement. It would have been obvious to multiplex a channel to fully utilize that bandwidth of communicating all types of measured data.

Regarding claim 4, the diameter of an acoustic channel is considered an obvious design choice since pipes comes in various sizes.

Regarding claim 5, both references teach this limitation.

Regarding claim 6, see Doremus reference.

Regarding claims 7-8, the laterally drilled borehole with tubing in Doremus is considered a tubular control line since signals are transmitted via the line using the filled tubing.

Regarding claim 9, the viscosity of the liquid is considered an obvious design choice since fluids of various densities are used in a wellbore.

Regarding claim 10, it is conventional to transmit acoustic signals downhole from the surface for control purposes. This would include a surface transmitter and a downhole receiver. The use of conventional means for their known functionality is considered obvious.

Regarding claim 11, the use of noise filters in mud pulse systems is conventional, and thus, obvious.

Regarding claim 12, the band of the waveform is considered an obvious design choice based on the frequency of transmission and location of noise and stop bands in the channel.

Regarding claim 13, Hahn teaches the use of waves. Sinusoidal waves are conventional carriers which are modulated with data. It would have been obvious to use conventional means for their known function.

Regarding claim 14, see paragraph 43 of Hahn.

Regarding claim 15, the system in Hahn is usable for all applications including well stimulation.

Regarding claim 16, this claim recites the steps of using the claimed invention in its intended manner. Since the apparatus has been shown to be obvious, the method of using the apparatus conventionally is also considered obvious.

Regarding claim 17, Hahn teaches downhole measurement of parameters, encoding and controlling a transmitter to send the data.

Regarding claim 18, the recited carrier wave is conventional for an acoustic system, and thus, obvious.

Regarding claim 19, the steps of generating, modulating and detecting have been addressed in prior claims. Doremus teaches the step of performing operating to improve production while established the claimed acoustic channel. It would have been obvious to combine the references since they are in the same field.

Regarding claim 20, Doremus teaches the lowering of coiled tubing into the borehole that is filled with liquid.

Regarding claims 21-22, the acoustic channel has been addressed in claim 1. It is conventional in telemetry system to include the transmission of control signals in response to measured data or to control the transmission of data. Within an acoustic system, the source or transmitter would be at the surface and the receiver located downhole would receive the operational commands.

Regarding claims 23-29, these limitations have been addressed in prior claims. The acoustic channel is the same in either direction.

Regarding claim 30, in bi-directional communication systems it is conventional that signals on each direction are on different bands to allow simultaneous transmission.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALBERT K. WONG whose telephone number is (571)272-3057. The examiner can normally be reached on M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian A. Zimmerman can be reached on 571-272-3059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Albert K Wong/  
Primary Examiner, Art Unit 2612

July 26, 2010